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Aeolian Processes in Old and New Industrialized Areas (A Case Study of Silesian Upland– Southern Poland)

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Upper Silesia is the most industrialized region in Poland with predominating black coal mining, iron metallurgy as well as zinc and lead ores mining and metallurgy.

The results of historical development in Silesian Upland are old and new industrialized areas, where on a rather large scale aeolian processes could occur. These processes are still going on (Szczypek, Wach, 1991).

The area of old industry is connected with the Middle Ages, when in eastern part of Silesian Upland silver and lead ores exploitation and metallurgy was started. The result of it was large demand for wood and charcoal to heat in the contemporary primitive works. Therefore, the process of deforestation in large sandy areas followed. Those times and later in the 16th century typical dune landscape was formed under the influence of westerly winds. Then so-called Bledow and Starczynow "Deserts"were originated, character of which remained almost till present times. These sandy areas originate from the Pleistocene and they are an effect of fluvioglacial and river waters accumulation. (Szczypek, Wach, 1991; Pelka-Gosciniak, 2000).

During hundred years the type of aeolian relief here gradually changed. Initially it mostly had a deflative character. Wide deflation areas dominated here and large dunes developed only at the border with humid river valley running across Bledow Desert as well as at the foothill of the Upper Jurassic cuesta, which limits the desert to the east.

The detailed observations of relief changes were possible at least on the base of arial photo analysis. They indicate that from 1950 till now and especially from 1970, when human being repeatedly interfered into this desert in a form of introduction of bushes of willow *Salix acutifolia* and *Salix arenaria*, the aeolian relief type gradually changed into accumulative and systems of changing in time and space small transverse as well as longitudinal dune forms appeared. Now deflation fields and dunes are to a large degree fixed by vegetation and "desert" landscape gradually disappears.

New industrialized areas include central and eastern parts of the Silesian Upland. They originate from the turn of the 19th century as well as from the 20th century and they are connected with the black coal mining and with zinc and lead ores metallurgy. Aeolian processes consist here in an intensive deflation of material from dumping grounds being an effect of mining and metallurgy (photo 1). This material often contains substances which are harmful for human health, e.g. heavy metals (Dulias, Pelka-Gosciniak, Radosz, 2002). It is transported even to distances of some km and reaches the neighboring towns. Apart from it in the area discussed

large sandpits appeared, material from which is used in mines as stowing sand. Therefore, on bare sandy substratum to a large scale aeolian processes occur, creating many different forms. Some years ago the development of typical anthropogenic scarp dune was here observed, which – in relation to human interference – was more or less intensively translocated accordingly to predominating westerly winds and it covered the border of pine forest (photo 2). Now, in result of processes of land reclamation this form was damaged (Pelka, 1994; Szczypek, Wach, 1999).

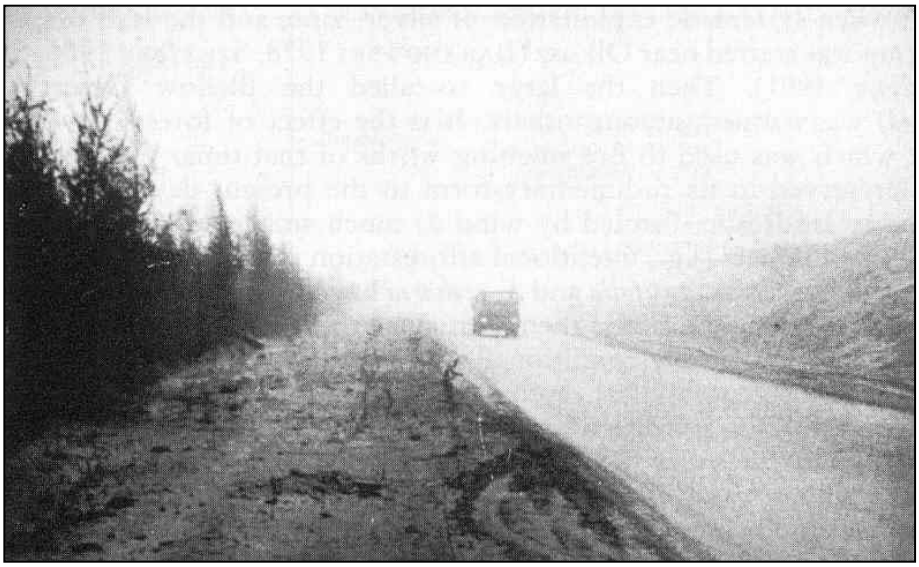

Photo 1. Deflation on dumping ground west of Olkusz (photo by T. Szczypek)

Photo 2. Anthropogenic scarp dune covering the pine forest (photo by T. Szczypek)

In both cases: old and new industrialized areas the development of aeolian processes was initiated by human impact on the neighboring environment (Szczypek, 1995; Pelka-Gosciniak, 2000). The human being created the proper conditions for aeolian processes to develop in a

natural way, giving these areas the "desert" character and causing the specific, new circulation of sandy material (Maszlej, Pelka-Gosciniak, 2001).

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